复旦大学物理系 物质科学报告

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The Advent of Two-dimensional Materials

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Two-dimensional (2D) atomic crystals, best exemplified by graphene, have emerged as a new class of material that may impact future science and technology. From a material physicist's point of view, 2D materials provides vast opportunities on two fronts: First, the reduced dimensionality in these 2D crystals often leads to novel material properties that are different from those in the bulk; Second, the entire 2D crystal is a surface, so it is possible to have better control of their material properties with external perturbations. In this talk I will first illustrate these two points with two examples: black phosphorus and 1T-TaS2. These two layered materials have vastly different properties. Black phosphorus is a 2D semiconductor, and its superior material quality has recently enabled us to observe the quantum Hall effect. 1T-TaS2, on the other hand, is a metal with a rich set of charge density wave phases; we explore their electronic properties while the doping and dimensionality of the 2D systems are modulated. I will then discuss our recent results on 2D ferromagnet and high Tc superconductors.

张远波，2000 年获北京大学学士学位。2000 年 8 月赴美国哥伦比亚大学物理系，于 2006 年获博士学位。同年获美国加州大学伯克利分校为期三年的 Miller Fellowship，从事博士后研究。2011 年起为复旦特聘教授，博士生导师。 张远波的研究方向为低维纳米体系，特别是石墨烯的电学和光学研究。在量子输运，扫描隧道显微和能谱技术，以及远红外能谱领域积累了丰富的研究经验。获得“求是”杰出青年学者奖（2013），上海市东方学者（2012），IUPAP Young Scientist Prize (IUPAP, 2010), Charles H. Townes Fellowship（Columbia University, 2005），Miller Fellowship Award（UC Berkeley，2006）等奖项。2011 年入选首批国家“青年千人计划”。